



IFW

PTO/SB/21 (09-04)

Approved for use through 07/31/2006. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

## TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

646

Application Number

10/533,914

Filing Date

05/05/2005

First Named Inventor

Gary Haughton

Art Unit

1723

Examiner Name

David L. Sorkin

Attorney Docket Number

P1112US04

### ENCLOSURES (Check all that apply)

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Fee Transmittal Form                             | <input type="checkbox"/> Drawing(s)   | <input type="checkbox"/> After Allowance Communication to TC                            |
| <input type="checkbox"/> Fee Attached                                     | <input type="checkbox"/> Licensing-related Papers                                       | <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences     |
| <input type="checkbox"/> Amendment/Reply                                  | <input type="checkbox"/> Petition   | <input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) |
| <input type="checkbox"/> After Final                                      | <input type="checkbox"/> Petition to Convert to a Provisional Application               | <input type="checkbox"/> Proprietary Information  |
| <input type="checkbox"/> Affidavits/declaration(s)                        | <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address | <input type="checkbox"/> Status Letter  |
| <input type="checkbox"/> Extension of Time Request                        | <input type="checkbox"/> Terminal Disclaimer  | <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below):         |
| <input type="checkbox"/> Express Abandonment Request                      | <input type="checkbox"/> Request for Refund   | - Return receipt Postcard   |
| <input checked="" type="checkbox"/> Information Disclosure Statement      | <input type="checkbox"/> CD, Number of CD(s) _____                                      | - 1 bound volume of Foreign Patents   |
| <input type="checkbox"/> Certified Copy of Priority Document(s)           | <input type="checkbox"/> Landscape Table on CD  | - 4 bound volumes of Non Patent Literature Documents                                    |
| <input type="checkbox"/> Reply to Missing Parts/ Incomplete Application   |   |   |
| <input type="checkbox"/> Reply to Missing Parts under 37 CFR 1.52 or 1.53 |   |   |

Remarks

### SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Hofbauer Associates		
Signature			
Printed name	Patrick J. Hofbauer		
Date	March 16, 2006	Reg. No.	32,336

### CERTIFICATE OF TRANSMISSION/MAILING

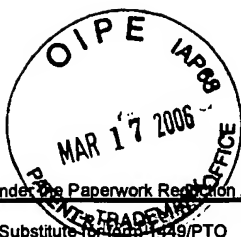
I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

21



PTO/SB/08A (07-05)

Approved for use through 07/31/2006. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for PTO Form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

**Complete if Known**

Application Number	10/533,914
Filing Date	05/05/2005
First Named Inventor	Gary Haughton
Art Unit	1723
Examiner Name	David L. Sorkin
Attorney Docket Number	P1112US04

Sheet 1 of 5

**U. S. PATENT DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
		US- 6,830,369	12-14-2004	Haughton et al.	
		US- 6,070,348	06-06-2000	Bianchetti	
		US- 6,007,237	12-28-1999	Latto	
		US- 5,947,784	09-07-1999	Cullen	
		US- 5,813,760	09-29-1998	Strong	
		US- 5,738,018	04-14-1998	Burnett	
		US- 5,100,242	03-31-1992	Latto	
		US- 5,052,813	10-01-1991	Latto	
		US- 4,534,914	08-13-1985	Takahashi et al.	
		US- 4,440,616	04-03-1984	Houseman	
		US- 4,439,300	03-27-1984	Houseman	
		US- 4,319,971	03-16-1982	Good et al.	
		US- 4,302,318	11-24-1981	Mock	
		US- 4,189,362	02-19-1980	Dotson	
		US- 4,169,681	10-02-1979	Kato	
		US- 4,125,439	11-14-1978	Fleischmann et al.	
		US- 4,054,503	10-18-1977	Higgins	
		US- 3,912,237	10-14-1975	Ostberg et al.	
		US- 3,560,366	02-02-1971	Fisher	

**FOREIGN PATENT DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T <sup>6</sup>
		Country Code <sup>3</sup> Number <sup>4</sup> Kind Code <sup>5</sup> (if known)				
		DE 75 04 145 U	06-19-1975	Muller		
		SU 858 898 A	08-30-1981	Umamskii		
		SU 967 541 A	10-23-1982	Fomenko		
		FR 2 605 244 A	04-22-1988	Bionaz		
		WO 02/083280 A1	10-24-2002	Amosco Technology Ltd.		
		JP 11 184 420 A	07-09-1999	Mitsubishi Electric Corp.		

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. <sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

**Complete if Known**

Application Number	10/533,914
Filing Date	05/05/2005
First Named Inventor	Gary Haughton
Art Unit	1723
Examiner Name	David L. Sorkin
Attorney Docket Number	P1112US04

Sheet 2 of 5

**U. S. PATENT DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
		US- 3,214,148	10-26-1965	Thomas	
		US- 2,661,938	12-08-1953	Kuentzel et al.	
		US- 2,615,692	10-28-1952	Muller	
		US- 2,557,503	06-19-1951	Hogaboom, Jr.	
		US- 2,064,402	12-15-1936	Bannister et al.	
		US- 1,408,596	03-07-1922	Heinrich	
		US- 1,345,312	06-29-1920	Blake	
		US- 567,503	09-08-1896	Pelatan & Clerici	
		US- 52,890	02-27-1866	Ryerson	
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			

**FOREIGN PATENT DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T <sup>6</sup>
		Country Code <sup>3</sup> Number <sup>4</sup> Kind Code <sup>5</sup> (if known)				
		GB 1 147 378 A	04-02-1969	Davis		
		JP 63104638	05-10-1988	Yoshida Masatoshi		
		DE 7416500	08-22-1974	Messerschmit-Bolkow-Blohm		
		FR 1 604 693 A	01-03-1972	Institut Merieux		

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. <sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  <i>(Use as many sheets as necessary)</i>				<b>Complete if Known</b>	
				Application Number	10/533,914
				Filing Date	05/05/2005
				First Named Inventor	Gary Haughton
				Art Unit	1723
				Examiner Name	David L. Sorkin
Sheet	3	of	5	Attorney Docket Number	P1112US04

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
		TURNER, J.S. Intermittent Release of Smoke from Chimneys. Journal of Mechanical Engineering Science 1960, Vol. 2, No. 2, pages 97-100.	
		KENDIG, F. The Science of Smoke Rings and Doughnuts. Saturday Review, March 18, 1972, pages 40 and 44.	
		MAXWORTHY, T. Turbulent Vortex Rings. J. Fluid Mech. 1974, Vol. 64, Part 2, pages 227-239.	
		BAIRD et al. Velocity and Momentum of Vortex Rings in Relation to Formation Parameters. The Canadian Journal of Chemical Engineering, February 1977, Vol. 55, pages 19-26.	
		MAXWORTHY, T. Some Experimental Studies of Vortex Rings. J. Fluid Mech. 1977, Vol. 81, Part 3, pages 465-495.	
		SAFFMAN, P.G. The Number of Waves on Unstable Vortex Rings. J. Fluid Mech. 1978, Vol. 84, Part 4, pages 625-639.	
		ROHATGI, A. Mixing Effects and Hydronamics of Vortex Rings. Ph.D. Thesis at McMaster University, Hamilton, Ontario, June 1978.	
		PULLIN, D.I. Vortex Ring Formation at Tube and Orifice Openings. Phys. Fluids 22(3), March 1979, pages 401-403.	
		ROHATGI et al. Mixing Effects and Hydrodynamics of Vortex Rings. The Canadian Journal of Chemical Engineering, August 1979, Vol. 57, pages 416-424.	
		DIDDEN, N. On the Formation of Vortex Rings: Rolling-Up and Production of Circulation. Journal of Applied Mathematics and Physics (ZAMP) 1979, Vol. 30, pages 101-116.	

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

**Complete if Known**

Application Number	10/533,914
Filing Date	05/05/2005
First Named Inventor	Gary Haughton
Art Unit	1723
Examiner Name	David L. Sorkin
Attorney Docket Number	P1112US04

Sheet 4 of 5

**NON PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
		Ontario Ministry of the Environment, Water Resources Branch, Province of Ontario. Hamilton Harbour Study 1977, March 1981, pages 1-A11.	
		ROHATGI et al. Gas Absorption at a Liquid Surface Agitated by Vortex Rings. The Canadian Journal of Chemical Engineering, June 1981, Vol. 59, pages 303-309.	
		GLEZER, A. An Experimental Study of a Turbulent Vortex Ring. Ph.D. Thesis at California Institute of Technology, Pasadena, California, 1981.	
		SU 858 898B (UMANSKII, M.P.) 1981.08.30. (abstract), Soviet Patent Abstracts, Week 198225, London: Derwent Publications Ltd., AN 1982-51962E.	
		SU 967 541 A (FOMENKO, Y.) 1982.10.23. (abstract), Soviet Patent Abstracts, Week 198334, London: Derwent Publications Ltd., AN 1983-745919.	
		AHMAD et al. Mixing of Stratified Liquids. Chem. Eng. Res. Des. May 1985, Vol. 63, pages 157-167.	
		LATTO, B. "New Mixer for Slurries and Stratified Fluids" In: Proc. 12th Int. Conf. on Slurry Technology: March 31-April 3, 1987, New Orleans, Louisiana, U.S.A..	
		JP 63 104638 A (MASATOSHI). Patent Abstracts of Japan, Vol. 12, no 344 (C-528), 1988.05.10 (abstract).	
		LATTO et al. Mixing of Thermally Stratified Fluids by Injecting a Series of Vortex Rings - A Numerical Simulation. Trans IChemE, September 1990, Vol. 68, Part A, pages 457-463	
		LATTO et al. "Use of Vortex Rings for Mixing". In: Industrial Applications of Fluid Mechanics 1990, ASME, New York, FED, Vol. 100, pages 79-86.	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

**Complete if Known**

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)	<b>Application Number</b>		10/533,914		
	<b>Filing Date</b>		05/05/2005		
	<b>First Named Inventor</b>		Gary Houghton		
	<b>Art Unit</b>		1723		
	<b>Examiner Name</b>		David L. Sorkin		
<b>Sheet</b>	5	<b>of</b>	5	<b>Attorney Docket Number</b>	P1112US04

**NON PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
		HUA, F. Numerical Simulation and Experimental Study of the Behaviour of Vortex Rings. Ph.D. Thesis at McMaster University, Hamilton, Ontario, 1994.	
		JP 11 184 420 A (MISTUBISHI ELECTRIC CORP.) 1999.07.09 (abstract). Japan Patent Abstracts, Section PQ, Week 199938, London: Derwent Publications Ltd., Class P85, AN 1999-44842	
		JP 11 184 420 A (MISTUBISHI ELECTRIC CORP.) Patent Abstracts of Japan, Vol. 1999, no. 12, 1999.07.09 (abstract).	

<b>Examiner Signature</b>		<b>Date Considered</b>	
---------------------------	--	------------------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.